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recorded data.

2. (Amended) A method of writing and re-writing optical data in a photorefractive polymeric material comprising:

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point of the beam thereby modulating the refractive index at the focal point to write data;

illuminating the material with radiation to erase the recorded data;

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point thereby modulating the refractive index at the focal point to re-write data in the photorefractive polymeric material.

3. (Amended) A method according to claim 1 wherein the modulation of the refractive index caused by the two-photon excitation is a refractive index inhomogeneity resulting from a non-uniform space-charge distribution within the region of excitation within the photorefractive polymeric material.

4. (Amended) A method according to any one of claim 1wherein the photorefractive material is illuminated with electro-magnetic radiation having a wavelength in the ultraviolet (UV) or visible spectrum to produce a redistribution of the spacial distribution of the electric charges forming bits of the data to erase the recorded data.

6. (Amended) A method according to claim 4 wherein the maximum of the absorption band of the photorefractive polymeric material falls substantially within the range from about 380 nm to about 600 nm.

7. (Amended) A method according to claim 4 wherein the

photorefractive polymeric material is such that is absorbs substantially no radiation above a wavelength of about 630 nm.

8. (Amended) A method according to claim 1 wherein the data recorded in the photorefractive polymeric material is read by illuminating the photorefractive polymeric material with coherent light of a wavelength falling substantially within the range from about 630 nm to about 1200 nm.

9. (Amended) A method according to claim 1 wherein the light used to record data in the photorefractive material has a wavelength falling substantially within the range from about 750 nm to about 1200 nm to cause two-photon excitation.

10. (Amended) A method according to claim 1 wherein a pulsed laser beam is used to record data in the photorefractive polymeric material.

11. (Amended) A method according to claim 1 wherein a continuous wave laser beam is used to record data in the photorefractive polymeric material.

12. (Amended) A method according to claim 1 wherein polarized coherent light is used to record polarized bits of data in the photorefractive polymeric material.

13. (Amended) A method according to claim 12 wherein different polarization states of the recording beam are used to record multiple bits of data at the same position having different polarization states in the photorefractive polymeric material.

14. (Amended) A method according to claim 12 wherein bits of recorded data are read by using a reading beam having an appropriate polarization state.

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15. (Amended) A method according to claim 12 wherein individual bits of data are erasable by changing the polarization state of the individual bits.

16. (Amended) A method according to claim 1 wherein the photorefractive polymeric material includes at least about 25% of a polymer by percentage weight of the total weight of the photorefractive material.

17. (Amended) A method according to claim 1 wherein the photorefractive polymeric material includes a chromophore which provides absorption in the UV to visible region of the electromagnetic spectrum.

18. (Amended) A method according to claim 1 wherein the photorefractive polymeric material includes a photosensitive material which provides absorption in the UV to visible region of the electromagnetic spectrum.

19. (Amended) A method according to claim 1 wherein the photorefractive polymeric material includes a plasticizer to reduce the glass transition temperature of the material.

20. (Amended) A method according to claim 1 wherein the photorefractive material includes at least some of the following materials in quantities falling substantially within the following ranges by percentage of the total weight of the photorefractive material:

25% - 99.5% of a polymer;
0.5%-60% of a chromophore;
0.5%-5% of a photosensitive material; and
0% - 40% of a plasticizer.

21. (Amended) A method according to claim 16 wherein the polymer comprises poly (*N*-vinylcarbazole) (PVK).

22. (Amended) A method according to claim 16 wherein the polymer comprises poly (methyl methacrylate) (MMA).

23. (Amended) A method according to claim 17 wherein the chromophore comprises 2, 5- dimethyl - 4 - (p-nitro-phenylazo) anisole (DMNPAA).

24. (Amended) A method according to claim 18 wherein the photosensitive material comprises 2, 4, 7-trinitro-9-fluorenone (TNF).

25. (Amended) A method according to claims 19 wherein the plasticizer comprises *N*-ethylcarbazole (ECZ).

26. (Amended) A photorefractive polymeric optical data storage material for use in a method of erasable/rewritable optical data storage, the photorefractive polymeric material providing absorption in the UV to visible region of the electromagnetic spectrum, wherein the absorption band of the photorefractive material is such as to enable the recording of bits of data by two photon excitation, the reading of the bits of data by a source of coherent light on the edge of or outside the absorption band, and the erasing of the bits of data by illumination with radiation within the absorption band.

28. (Amended) A photorefractive polymeric material according to claim 26 wherein the upper end of the absorption band of the photorefractive polymeric material is about 630 nm.

29. (Amended) A photorefractive polymeric material according to

claim 26 wherein the material includes at least about 25% of a polymer by percentage weight of the total weight of the photorefractive material.

30. (Amended) A photorefractive polymeric material according to claim 26 wherein the material includes a chromophore which provides absorption in the UV to visible region of the electromagnetic spectrum.

32. (Amended) A photorefractive polymeric material according to claim 26 wherein the material includes a photosensitive material which provides absorption in the UV to visible region of the electromagnetic spectrum.

34. (Amended) A photorefractive polymeric material according to claim 26 wherein the material includes a plasticizer to reduce the glass transition temperature of the material.

36. (Amended) A photorefractive optical data storage medium for use in a method of erasable/rewritable optical data storage in which light is focused on the data storage medium to modulate the refractive index at the focal point by two-photon excitation, wherein the medium includes at least some of the following materials in quantities falling substantially within the following ranges by percentage of the total weight of the photorefractive data storage medium:

25% - 99.5% of a polymer;
0.5% - 60% of a chromophore;
0.5% - 5% of a photosensitive material; and
0% - 40% of a plasticizer.

37. (Amended) A photorefractive optical data storage medium according to claim 29 wherein the polymer comprises poly (*N*-vinylcarbazole) (PVK).

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38. (Amended) A photorefractive optical data storage medium according to claim 29 wherein the polymer comprises poly (methyl methacrylate) (PMMA).

39. (Amended) A photorefractive optical data storage medium according to claim 30 wherein the chromophore comprises 2,5-dimethyl-4-(p-nitro phenylazo) anisole (DMNPAA).

40. (Amended) A photorefractive optical data storage medium according to claim 32 wherein the photosensitive material comprises 2, 4, 7-trinitro-9-fluorenone (TNF).

41. (Amended) A photorefractive optical data storage medium according to claims 34 wherein the plasticiser comprises N-ethylcarbazole (ECZ).

42. (Amended) A photorefractive optical data storage medium adapted for use in a method of erasable/rewritable optical data storage in which the light is focused on the data storage medium to modulate the refractive index at the focal point by two photon excitation, wherein the medium includes the following materials:

poly(*N*-vinylcarbazole) (PVK);
2,5, dimethyl-4-(p-nitrophenylazo) anisole (DMNPAA)
2,4,7-trinitro-9-fluorenone (TNF); and
N-ethylcarbazole (ECZ).

43. (Amended) A photorefractive optical data storage medium according to claim 42 wherein the PVK;DMNPAA;TNF and ECZ are present in approximately the following concentrations by percentage weight of the total weight of the photorefractive material 33:50:1:16.